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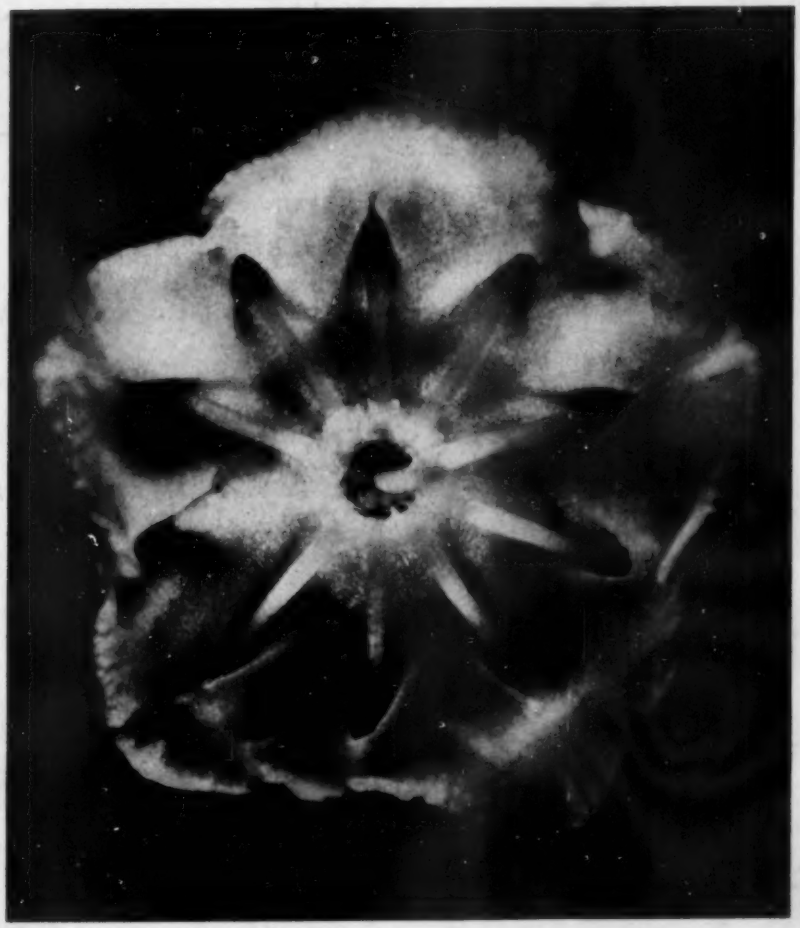
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



FEBRUARY 8, 1936

Decimal Perfection

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A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

VOL. XXIX *No. 774*

The Weekly Summary of

Current Science

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DO YOU KNOW?

A rattlesnake does not always sound its rattle as a warning before striking.

A new magnetic detector is used to hunt "lost" city pipes, and has located some hidden seven feet deep.

The recent disastrous drought in the Imperial Valley of California, costing ten million dollars, cannot recur with Boulder Dam "on the job."

A British speech teacher predicts that the anti-noise drive in New York will improve speech because New Yorkers will not have to shout to make themselves heard.

A curious stone from South Africa, now being commercially developed, is said to be flexible, elastic, acid proof, weather resistant, and capable of being planed, sawed or turned in a lathe.

For the price of a phone call, Berlin residents may now obtain the correct time over the telephone from an automatic announcing device, and the innovation is so popular that the revenue is figured at about $2,000 a day.

When X-rays were discovered, popular ideas regarding their power were so ridiculous that X-ray proof clothes were advertised.

Engineers at Pennsylvania State College report that they have devised apparatus for testing Diesel engine fuels quickly and accurately.

Of all foreign students in this country, Chinese speak English best and Germans rate second, according to observations at International House, New York City.

The old Chinese belief that fossil bones were dragon bones and good medicine has undoubtedly caused destruction of many rare specimens showing what China's ancient animal life was like.

Sleeping cars are so arranged that passengers lie "head first" toward the engine because in earlier times soot and drafts were less troublesome that way, explains an ambulance company which considers the opposite way of lying to be more restful in a moving conveyance.

WITH THE SCIENCES THIS WEEK

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A SCIENCE SERVICE PUBLICATION

MEDICINE

Coughs May be Prevented By Process of "Hardening"

Some Coughs Called Useful by Chicago Physician, Who Presents Full Discussion in Medical Journal

IF YOU can not take your cough south this winter, what should you do with it?

Eight pages in the current issue of the *Journal of the American Medical Association* are given over to the treatment of coughs. Dr. Bernard Fantus, director of therapeutics at Cook County Hospital, Chicago, is the author of this exhaustive treatment of an exhausting complaint.

A person who has constant colds and a cough that hangs on all winter but disappears in the summer needs "hardening," Dr. Fantus declares. He needs to be taught to wear either fewer or more clothes, as the case may be, and to lead an outdoor life. If he is too old or too sick to go through the hardening process, a change of climate is recommended.

For the chronic coughers who can not afford to travel, there remains the artificial tropical climate of indoor confinement. Such a cougher needs to have a uniform temperature day and night. The bed should be warmed before he gets into it. He should have a glass of hot lemonade at bedtime and the first thing in the morning.

The doctor rarely tries to check a cough, Dr. Fantus says, because most coughs are useful. He tells the various measures used successfully at Cook County Hospital to treat the three kinds of useful coughs: the tight cough, the loose cough, and the insufficient cough.

A doctor is very loath to condemn a cough as useless. A cough is useless when it fails to bring up any secretion because there is none to bring up. The useless cough is harmful for the reason that coughing begets coughing. Violent coughing irritates the bronchial tissue and such irritation leads to further coughing.

The nervous cougher furnishes an example of the useless type of cough. He coughs when there is an embarrassing pause in the conversation or when some one inquires about his health.

All chronic coughs, according to Dr. Fantus, are due to "irritation plus," "nutrition minus," or a combination of the two.

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FROM EASTER ISLAND

ARCHAEOLOGY

Cast of Easter Island Head Placed in American Museum

AN ALICE in Wonderland dream. A human head ten feet tall, with a neck but no body. This is the gigantic trophy an expedition has brought back from mysterious Easter Island to show Americans what the famed great stone faces of that Pacific isle are like.

The giant head is greeting strangers with a scowl, in the entrance hall to New York's American Museum of Natural History. When Dr. Harry L. Shapiro, anthropologist of the American Museum-Crocker Pacific Expedition, stands beside his strange trophy, his eyes are on a level with the Mystery Man's nose—that is, just the tip of the nose—and his hand rests comfortably at the Mystery Man's pouting mouth.

The head is a plaster cast, made with great difficulty under broiling sun and amid clouds of insects, by Toshio Aseida of the expedition staff.

The expedition could have chosen a head 30 or 40 feet tall to cast, but chose a conservative size, as being enough of a technical problem. The museum might have been embarrassed by a 40 foot head to take care of, Dr. Shapiro figured.

Science News Letter, February 8, 1936

GENERAL SCIENCE

Laymen Should Know About The Findings of Science

THE LAYMAN should learn more about the work of science, and scientists show the way to this result by being willing to tell of their discoveries. This in substance was a major part of the address of Prof. W. A. Neilson, president of Smith College, before the St. Louis meeting of Phi Beta Kappa honor society.

Said President Neilson in part:

"I come now to the question of the popularization (of science). It is natural and proper that the scholar should seek his first audience among his fellow scholars, that he should submit the results . . . to a jury of his peers, and should find his main satisfaction in their approval. Until their verdict has been rendered, there is danger both to the scholar and to the truth he believes he has discovered in carrying it to the lay public, and the shade of disapproval that hovers about the word 'popularizer' has its origin in a wholesome reluctance. Realizing this, I yet wish to make a plea for the rights of the intelligent public outside the ranks of professional investigators to share the results.

"The main reason why inaccurate reports of such matters reach the general public is the unwillingness or inability of the research scholar to provide an account for the general reader himself. We may as well recognize the fact that the newspapers and the public will be served, if not by those who know, then by those who half-know. The support of research must ultimately come from the laity: it is of immense importance

that the laity be as well-informed as possible.

"It may be objected that there is much of the greatest importance in modern science that is too difficult to be explained to the general reader . . . but I believe it is not nearly so frequently true as the specialist is apt to think. The most difficult ideas to explain to the layman are often those that are obscure also in the mind of the professional.

"Much of the difficulty comes from terminology. I am well aware of the fact that a technical terminology may save time and avoid inaccuracy: in mathematics, of which I know nothing, it would seem to be essential and untranslatable. But, at the risk of being numbered with the Philistines, I venture to say that it is often unnecessary hocus-pocus. The medical profession, for which I have unbounded veneration, has for a thousand years harbored practitioners who sought to gain prestige among the ignorant by using Greek and Latin terms for phenomena with perfectly good English names. And today the sociologists are building up a terrible jargon, though I have yet to find in their books an idea which is not capable of being explained in standard English."

Science News Letter, February 8, 1936

CHEMISTRY

Chemists Seek Uses For Molasses-Thick Oil

MOLASSES in January has a new and peculiar rival in the form of "viscous oil," a Western petroleum product. Specimens of this oil now being inspected by manufacturers resemble clear, transparent honey, but of so thick and sticky a character that the liquid can scarcely be poured from a bottle. With substantial quantities of the oil available upon demand, petroleum engineers are now speculating on possible uses for a fluid which is so sluggish that it measures, at 100 degrees Fahrenheit, as high as 144,000 on the Saybolt scale of viscosity.

R. A. Halloran, petroleum research chemist of San Francisco, describes the new viscous oil chemically as purely hydrocarbon in composition, with very high flash point. Different degrees of viscosity may readily be attained in manufacture, running all the way from a relatively thin oil, like common intestinal lubricant, to the extremely thick, almost taffy-like higher product. The most viscous oil exhibited has an average molecular weight of 1280, indicating to chemists that a single unit particle of the liquid contains nearly one hundred atoms of carbon. The chemical structure is a matter of dispute among chemists, some thinking that the carbon atoms are bunched in grape-fashion. Others regard them as clumped together in multiple rings.

"These products are manufactured from petroleum," states Mr. Halloran, "but do not occur naturally in the crude. The higher members are very inert and resistant to oxidation. They form no carbon residue on heating and contain no sulfur or acid compounds of any nature."

The attractive appearance of the viscous oil, while suggestive of hot biscuits and pancakes, is quite deceptive. Not only is the oil tasteless and odorless, but it is totally indigestible. Perhaps its most promising application will be in the role just opposite to that of a lubricant—a medium which will retard motion instead of assisting it.

Science News Letter, February 8, 1936

THE EARTH IS AN ONION

ENGINEERING

Storm Windows Save Fifth Of Coal in Test House

FUEL savings of one ton of coal out of every five burned have been obtained by the use of storm doors and windows on the research home maintained by the University of Illinois, according to the report presented to the meeting of the American Society of Heating and Ventilating Engineer. Prof. A. P. Kratz and S. Konzo, research associate, of the Engineering Experiment Station, made the announcement.

Using a coal-fired furnace with a forced-air heating system, the house was maintained at a temperature of 71 degrees Fahrenheit by thermostat control.

It took from 100 to 260 pounds of coal each day to maintain the 71 degrees in outside temperatures from 40 to zero degrees Fahrenheit if the storm windows were not in place. With storm windows, the same outside conditions required only from 80 to 200 pounds of coal daily. Thus 20 pounds of coal were saved on 40-degree days and 60 pounds on zero days.

"The results indicate that a saving of 20 per cent. in the seasonal fuel consumption could be reasonably attributed to the installation of storm doors and windows," concluded the scientists.

Other results include:

1. Storm sashes practically eliminate the entrance of soot.

2. Higher relative humidity can be maintained indoors before condensation appears on the glass.

3. Storm windows reduce the draft of cold air down the windows and thus increase the temperature of air near the floor.

Science News Letter, February 8, 1936

GEOPHYSICS

Model Shows Layered Interior of Earth

THE earth is not simply a round lump of stone, uniform from core to circumference, as the more enlightened among the ancients thought it. Neither is it a thin-crusted ball of liquid fire, as more recent notions would have it. It is a series of concentric shells, laid onion-fashion over a solid core that seems to be made of nickel-iron.

This doctrine, largely the product of studies of earthquake waves that have passed through the earth, is given concrete illustration in the built-up sectioned globe shown at the recent meeting of the American Association for the Advance-

ment of Science in St. Louis, by the Jesuit Seismological Association.

Each shell is named for the seismologist who first described it; ribbons lead from the various layers to samples of minerals illustrating the kind of stuff they are made of. All the familiar rocks of the earth's surface crust occupy a space not much thicker, proportionately, than a rather heavy coat of paint.

Science News Letter, February 8, 1936

ZOOLOGY

Unusual Obituary Tells of Death of Oldest Chimpanzee

UNUSUAL among obituary notices is one published in *Science* (Jan. 31), telling of the death of the oldest chimpanzee in captivity. Jimmy, aged about 40 years, died on Nov. 28 in the Philadelphia Zoological Garden.

Michael I. Tomilin, who had Jimmy in charge and who writes his death notice, believes he died of "old age." Jimmy came to the Philadelphia Zoo in 1931 from the late Mme. Rosalina Abreau's private primate colony in Havana, with the reputation of being a "tough customer." At Philadelphia he gradually became quite manageable, and during the last months of his life, evidently due to senility, he was gentle.

Yale University's Psycho-Biological Department was willed Jimmy's body by Mme. Abreau, and as a result science expects to have new information about old age in one of man's relatives.

Science News Letter, February 8, 1936

RADIO

Tiny Radio Sets Help Handle Long Freight Trains

LOW-powered radio transmitters are being used experimentally on at least one eastern railroad for communication between locomotive and caboose on long freight trains, it was disclosed in New York City recently by S. G. Ellis before the meeting of the American Institute of Electrical Engineers.

Tests covering 18 months' time, 36,000 miles of travel and with the radio in operation for a total of 1,800 hours were described by Mr. Ellis of the Westinghouse Electric Company. The tests were made on the New York, New Haven and Hartford Railroad.

The transmitter used had only 15 watts power and a range of only a few miles. Tests were satisfactory for freight trains of 130 cars in length.

Science News Letter, February 8, 1936

PHYSICS

First Synthesis of Naturally Found Radioactive Substance

Radium E Built Up by Bombarding Bismuth With Heavy Hydrogen Particles at 12,000-Mile-an-Hour Velocity

MAN HAS at last been able to make a radioactive substance that occurs in nature.

By powerful bombardments of a common substance there has been created synthetically in the radiation laboratory of the University of California a form of radium.

This first synthetic production of any naturally occurring radioactive substance is the accomplishment of Dr. J. J. Livingood, research associate.

The substance which he has created for the first time by artificial laboratory methods is radium E, one of the intermediary products in the slow decay of ordinary radium to lead. The amount of radium E so far obtained is almost infinitesimal, but careful checks leave no doubt as to its identity.

Synthetic radium E was obtained by Dr. Livingood through the bombardment of the common, inert substance bismuth with deuterons at an energy of approximately five and a half million electron volts.

This product behaves exactly as does natural radium E. Tests have shown that it decays with a half-life of five days by emitting electrons and is converted into polonium which continues the decay by emitting alpha particles at a half-life rate of about one hundred forty days. The end product of this process is lead, though tests so far have been limited to determining the type and rate of radiation.

This new step in the transmutation of matter was taken in the laboratory of Prof. E. O. Lawrence, using the eighty-five ton cyclotron or atomic disintegrator designed by him which has already been successful in transmuting more than a third of all elements known to man.

The conversion of bismuth, heaviest nonradioactive element, into radium E, is considered final proof that the apparatus will induce changes in every kind of matter. The deuteron bullets used in bombarding substances to be transmuted are the nuclei of double-weight hydrogen atoms obtained from heavy water costing approximately $600 a pint.

These bullets are shot from the cyclotron at velocities of twelve thousand or more miles per second at the rate of one hundred thousand billion per second. Substances placed in the path of this barrage are disintegrated or fundamentally changed in nature. Recently platinum was converted into gold.

Seventeen different research centers throughout the world have reported that they are building or planning to build replicas of the atom disintegrator at the University of California. Three of the centers are in Russia, two in England, one in Japan, one in Denmark, and ten in the United States, namely the Universities of Michigan, Chicago, Rochester, Washington, Illinois, Cornell, Princeton, Purdue, Columbia, and the Franklin Institute.

Science News Letter, February 8, 1936

CHEMISTRY

Onions' "Breath" Measured For Strength by New Method

ONIONS can now have the strength of their "breath" measured.

Stated in slightly more technical terms, a definitely quantitative measurement can be made of their pungency, by a new distillation process devised by Hans Platenius, a young research scientist at Cornell University. Mr. Platenius's technique is no mere chemical stunt, either; anyone who has ever bought or sold onions in quantity knows that strength or mildness in onions is reflected in cold cash on the hard cobblestones of the produce marketplace.

The Cornell onion-"breath" measuring system is based on the fact that the pungency of an onion depends on a sulphur-containing oil. There is very little of this in an onion. One mass analysis some years ago used up more than five tons of onions and yielded less than half a pound of the oil. But it goes a long way.

The oil, which is known chemically as allyl-propyl-disulphide, contains about 43 per cent. of sulphur by weight. Hence, any method which will measure

the amount of sulphur that can be evaporated out of a given lot of onions should give an indirect measurement of the quantity of the oniony oil present, and hence of the strength of the onions' "breath."

This is just what Mr. Platenius's method does. He steams off the vaporizable sulphur from the sample of onions under analysis, and then by suitable chemical means precipitates out the sulphur so that it can be weighed. The method is rather slow, so that it is not recommended for routine analysis, but it offers the first accurate quantitative estimate of the relative strengths of different lots of onions to replace the human nose.

Science News Letter, February 8, 1936

PHYSICS

Method of Striking Key Has no Effect on Tone

DESPITE statements of eminent pianists to the contrary, the tone produced by striking a given key on a piano is the same no matter in what manner the key is struck. Ignace Paderewski is the notable exception among the musicians who cling to the idea that in some manner the way the key is struck influences tone.

New research on this question, which has been a bone of contention between physicists and musicians for years, was presented before the Franklin Institute by Prof. Charles Weyl of the University of Pennsylvania's school of electrical engineering.

Principal demonstration of Prof. Weyl was a giant model of the action of a grand piano consisting of one key, one hammer and one string. With it he was able to show that after striking the key a musician has no more control over the tone than a marksman has over a bullet after he has pressed the trigger of his gun.

According to musicians' views, tone and loudness are separate factors controlled by the manner of depressing the piano keys. Scientists claim that both tone and loudness are determined simultaneously by the piano key. Only the velocity of the hammer at the instant of striking the string is determined by the key. And the same tone and loudness can be produced by any method which would yield the same velocity of impact.

Prof. Weyl showed a "mechanical pianist" in a mechanism which produced more accurately and repeatedly a given tone than any pianist could do. "In fact," said Prof. Weyl, "the device is able to produce many more gradations of tone than the most competent pianist, no matter how great his technique."

The mechanical pianist also demonstrated for the audience gradations of tone so small that no ear could detect them; yet they were visible on an oscillograph.

Another demonstration with a mechanical striker indicated that the same tone could be produced by three different methods of striking a piano key, corresponding to three different methods of human touch.

"The evidence offered," said Prof. Weyl, "indicates that eminent pianists were unable to detect tone differences five times as great as were detected by the oscillograph equipment. They were also unable to detect the difference between mechanically produced tones and those produced by a pianist.

"My report," Prof. Weyl added, "serves to prove the entirely mechanical nature of the piano as a musical instrument when considered from the point of view of the interdependence of tone and loudness, and also the ineffectuality from the tonal point of view of difference in touch."

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BIOLOGY

Disease Virus Identified As Non-Living Substance

NON-LIVING crystals of definite chemical composition, like the protein in our food, assume the guilt for causing disease hitherto attributed only to living germs, as a result of fresh scientific evidence unearthed by Drs. W. M. Stanley and H. S. Loring of the Rockefeller Institute for Medical Research laboratories at Princeton, N. J. (*Science*, Jan. 25.)

From sick tomato plants, suffering from mosaic disease, the scientists isolated crystals of a protein substance that has the same chemical, physical and biological properties as the protein crystals they previously found guilty of causing mosaic disease in tobacco plants. (See *SNL*, July 20, 1935)

The newly-discovered evidence is of wide importance. It relates to the problem of viruses, such as cause both the mosaic disease of plants, and various human diseases like infantile paralysis. Scientists have thought that these viruses were living organisms, although so small that they cannot be seen under the microscope and pass through the pores of the finest porcelain filters.

Dr. Stanley's investigations show that the cause of this one "virus disease," tobacco mosaic, is not a living substance but a non-living chemical. It may be that the agents which cause other virus diseases are also non-living chemical substances. If this proves to be the case, it will provide an entirely new line of attack on a large group of diseases that afflict animals and man.

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BIOLOGY

Evolutionary Changes Found In Virus of Tobacco Mosaic

EVOLUTIONARY changes occurring in something that is not really alive constitute a paradox arising out of the discovery, by H. H. McKinney of the U. S. Department of Agriculture, that one form of a mosaic disease of plants can change, or "mutate," into another form.

Thus, the ordinary type of tobacco mosaic often mutates into a yellow type, which can be propagated as a continuous pure strain. Similarly, a virus disease of wheat mutates from a green to a yellow form. Other changes of like nature in virus diseases have been observed by Mr. McKinney.

These viruses are among the most puzzling of things with which biologists have to deal. They can pass through the pores of fine porcelain filters, and cannot be seen under the microscope. They cause diseases and at the same time propagate themselves very much as though they were living micro-organisms; yet in other respects they behave as though they were simply non-living chemical substances.

Recently an investigator on the staff of the Rockefeller Institute, Dr. W. M. Stanley, has produced non-living crystals of a protein substance that can cause mosaic disease in tobacco, and which appears to be the virus itself.

If this substance really is the virus, and it really is not alive, we have in Mr. McKinney's mutation observations a most puzzling state of affairs—a biological process taking place in a non-living thing.

Science News Letter, February 8, 1936

AVIATION

New Aviation Trend is Now Toward Simpler Flying

"SMART airplanes for dumb pilots" is the newest trend in aviation reported to the meeting of the Society of Automotive Engineers.

That is the blunt title of the report delivered by Assistant Professor Otto C. Koppen of Massachusetts Institute of Technology.

"Everyman's Airplane, a Development toward Simpler Flying" is a less drastic title of the paper on the same trend by Fred. E. Weick, senior aeronautical engineer of the National Advisory Committee for Aeronautics.

"There are two ways of looking at the question of flying characteristics; the first is to train the pilot to fly the airplane in spite of the way it flies, and the second is to design the airplane to avoid the difficulties of the novice pilot. The first method has been in vogue for the past twenty years but the second is slowly gaining momentum largely through the efforts of the Bureau of Air Commerce and interested airplane manufacturers," declared Prof. Koppen.

The novice pilot, Prof. Koppen pointed out, has to combat, by suitable control movements, the three types of motion which any plane possesses; longitudinal and lateral oscillation and lateral divergence.

Depending on flying skill, there is a lag in making the control motions needed to overcome these three movements.

If the plane has rapid oscillation and the pilot a large personal lag it is not impossible that the controlling movements will be so timed that they increase, rather than diminish, the plane's oscillations.

The new trend in airplane construction is to reduce the effect of the pilot's errors of judgment and of control motion.

This last point of error in control motion is practically always in the direction of over-control. Damping devices on the controls could be used, said Prof. Koppen. They would not limit the controllability of the plane but rather the rate at which the controlling force can be applied.

If, in the motor car, as an imaginary example, the machine turned over on its nose when the brakes were applied too rapidly (as can happen with an airplane) there probably would be comparable damping devices to prevent the brake over-control.

The National Advisory Committee for Aeronautics, revealed Mr. Weick, has made extensive tests on the experimental plane known as W-1A—for use by the average man—which have demonstrated that three-wheel landing gear makes possible satisfactory landings almost regardless of the wind direction, the air speed at contact or the manner in which the plane is flared or guided to the ground.

When it is realized that practically the entire time of dual instruction before solo flight is devoted to making landings, and more than half of all aviation accidents are the result of either bad or forced landings, the importance of just the single item of fool-proof landings can be appreciated.

Moreover the new W-1A plane, declares Mr. Weick, uses glide-control flaps, very helpful in determining, for the novice pilot, the right angle of landing approach. Most new pilots try landing at too steep angles with respect to the ground. With such flaps, the N.A.C.A. expert states, "the unskilled pilot can make contact with the ground at a desired point with greater accuracy than a good pilot with the conventional plane."

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ENGINEERING

Future Motor Car Features Rear Drive, Air Conditioning

THE MOTOR car of the future will be air-conditioned, shaped like a teardrop, have self-inflating tires and individual movable seats, declared Austin M. Wolf, automotive consultant in an address before the meeting of the Society of Automotive Engineers. Project yourself ten years ahead in time.

Time—Summer of 1946.

Place — A cross-country super-highway. A motor car speeds by.

The car is compact but shaped like a teardrop traveling large end forward. Its five passengers sit in individual movable seats in air conditioned comfort despite the sweltering day. Their luggage is concealed in the bulbous front end. They sit three in front and two in the rear, just ahead of the motor.

The car has six tires, two in front and four in the rear where the power is applied. But the car's occupants have no worries about those tires. They are self-inflating and if a blowout occurs they will not collapse.

Despite the heat there are no worries about the battery running dry. It is self-filling. And six months from now in the cold winter the car's owner will have no sleepless nights worrying about starting in the frosty morning. He knows his car has two fuel tanks. In cold weather it starts with a light volatile fuel and then, when hot enough, switches over automatically to the ordinary variety.

Moreover, the old troubles back in 1936 about cooling the engine and the brakes are ended. The air-conditioning system is used to cool both of them, in addition to making the car interior comfortable in all ranges of temperature and humidity. The front styling fad of 1936 fortunately has disappeared and the radiators have adequate cooling surfaces so that the drain on the air-conditioning system is almost negligible, except on a torrid day like the present.

On the dashboard only two instruments are calibrated; the speedometer and the gasoline gauge. The oil pressure, ampere charging or discharging rate, and the engine temperature indicator consist only of red and green lights, with the red flashing when something is wrong.

The trend started in 1936, when the brake lever went up on the instrument board, has been followed by putting the gear shift in the same place. There is plenty of leg room for all occupants.

Back in the factory the car was stamped out of two great pieces of metal at one operation and then welded lengthwise down the middle. The old bus is pretty good but what the driver really wants is one of those new styles with the molded plastic body over a light but strong alloy frame. Those plastic ashtrays and gadgets of 1936 have come a long way in the last ten years.

Science News Letter, February 8, 1936

BACTERIOLOGY

Bacteria of Legume Roots Attacked by Bacteriophage

BACTERIA that live in nodules on the roots of plants of the pea family and capture nitrogen from the air seem to be preyed upon by a bacteriophage, or group of bacteriophages, of their own.

H. Katznelson of the State College of Washington, tried producing bacteriophages from several different kinds of legume root nodules. Several of his plants, including clover, alfalfa and Austrian lentil, did not do very well and yielded nothing. But a good strong "phage" was obtained from the nodules of vetch plants. Thinned out in water to one-billionth of full strength, it could still dissolve the bacteria from which it had been derived.

Bacteriophages are a strange group of invisible germ-dissolvers that may be living organisms and may be merely complex "almost-alive" chemical compounds. First discovered some years ago by the Canadian bacteriologist D'Herelle, they are still a great riddle to biologists.

Mr. Katznelson's studies on this new type of bacteriophage were reported before the annual meeting of the scientific honor society Phi Sigma.

Science News Letter, February 8, 1936

PHYSICS

Astronomers and Cooks Profit From Same Research

ASTRONOMY and cooking marched hand in hand during the three years' research which led to the development of the ultra-low expansion type of glass that was used in the great 200-inch diameter disk of glass for the new telescope of California Institute of Technology. The story is now told by officials of the Corning Glass Works.

Astronomy obtained the disk for the telescope mirror out of investigations in which 1,500 different kinds of glass was studied. Housewives will benefit from the same work, for one of the new glasses is now being used for a new type top-of-the stove glass cooking utensil.

The new style glassware has a still lower coefficient of expansion than the well-known oven glassware already manufactured by the glass company. The new glass, which can be placed right over a flame on the stove, is designed to supplement rather than replace the present oven-type glassware.

What makes ordinary glass crack when heated suddenly or unevenly, indicates Dr. J. C. Hostetter, who had charge of making the great telescope disk, is the large coefficient of expansion which sets up unequal stresses that finally pull the glass apart.

For glassware used directly over a flame the minimum coefficient of expansion is a desirable characteristic but it must be coupled with other factors such as mechanical strength and length of useful life.

For the great telescope mirror disk low expansion was also a major requirement. Thus the search for the proper glass had the two objectives, with astronomers and the housewife jointly benefitting.

Science News Letter, February 8, 1936

RADIO

Noises "Commit Suicide" In New Radio Device

MAKING the troublesome popping and cracking line noises in a radio receiver set commit suicide is the newest method of attack on eliminating the sounds that appear when lights in the home are switched on or off, or the vacuum cleaner put into operation.

James J. Lamb, technical editor of the American Radio Relay League's magazine QST, describes how noise suicide works. (*QST*, February.)

Many of the popping and cracking sounds that come out of the loudspeaker are due to very quick acting disturbances in the radio receiver circuit which would be fairly harmless except that the loudspeaker picks them up, starts vibrating and keeps it up for an appreciable length of time because of its inertia.

Mr. Lamb's method, which is described in full detail for his technical audience, is based essentially on the following line of reasoning. He says:

"Why not amplify the noise peaks extending above the desired signal amplitude at radio frequency, rectify them, and use the rectified voltage to control the gain of a subsequent radio-frequency stage, automatically and instantaneously?"

Which says essentially that the quick-acting noises will be turned into a form of current that can be used to increase the amplification of the receiving set and thus raise the sought-for program signals to a loudness that will mask the popping. In a way the method is a type of automatic volume control that acts before the loud speaker can become aware of the oncoming noise.

Science News Letter, February 8, 1936

IN SCIEN

ZOOLOGY

White, Pink-Eyed Elephant Reported Killed in Africa

WHITE elephants are no longer a Siamese monopoly; Africa can claim at least one. A white elephant with pink eyes—a true albino animal—was killed not long ago by a game warden on the plains of Laikipia, in Kenya Colony, Africa. Like all "white" elephants, the animal was in reality only a dirty gray in color, but every hair on its body was white.

The Kenya Game Warden's report relates terrible effects on wildlife of three years of drought. There are records of elephants falling into wells and perishing because they were too weak to get out again. A number of rhinoceroses and many buffalo have also died in their frantic efforts to get water. In northern Kenya, herds of wild elephants hid behind cattle while natives dug for water, and when it was found stampeded forward to get the first drink.

Science News Letter, February 8, 1936

ENGINEERING

Research on Wire Strength Promises Safer Elevators

A NEW machine for testing the strength of wires, which whirls the material under test like egg beater blades, has been developed by John N. Kenyon, testing engineer of Columbia University.

Safer elevators and decreased cable rope failures on hoisting apparatus should result from the new invention because it can study wires whose thickness is only twenty-four thousandths of an inch—the type used in making hoisting cable.

The wire under test is bent in the form of an arc and whirled at from 5,000 to 10,000 revolutions a minute in a bath of oil. Tiny cracks which develop in the wire surface are opened and closed each revolution and eventually the wire breaks. The machine thus ascertains how long a wire may be submitted to this type of stress which is similar to that of stopping, starting and jerking in elevator operation.

Science News Letter, February 8, 1936

...E FIELDS

ETHNOLOGY

Devilfish and Barnacles Eaten by California Indians

PEOPLE will eat queer things, if they have to—or if they happen to like them. The diet of the Pomo Indians of the California coast once included such marine delicacies as devilfish, barnacles, sea-urchins, sea-anemones, sea-cucumbers and various kinds of seaweed, besides such more familiar items as lobsters, crabs, mussels and abalone.

Altogether, fifteen seashore animal species and three kinds of marine plants were eaten by these Indians, Omer C. Stewart of the University of California has learned. His investigations included questioning aged members of the tribe, and digging in the refuse mounds left by many generations of feasters.

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ARCHAEOLOGY

First "Newspapers" May Have Been Stone Scarabs

EGYPT flashes a gleam of light on the beginnings of newspaper history.

It seems that a pharaoh wishing to send important news of his reign to far-flung cities and provinces, might order the news inscribed on scarabs. Scarabs were amulets or other objects in the shape of the sacred Egyptian beetle, symbol of resurrection.

That the inscribed scarabs were actually distributed as newsletters is indicated by translation of a scarab acquired by the Metropolitan Museum of Art in New York. The scarab is one issued by Egypt's resplendant young "Golden Emperor," Amen-hotpe III, in 1422 B.C.

Five different news scarabs of this pharaoh are known to Egyptologists. Amen-hotpe used scarabs as one way of announcing his wedding, or rather one of his weddings. He used this method of proclaiming his score of killing ten lions a year, average, in the hunt. The lion-hunting item is a scarab record of which no less than forty copies are preserved in collections today. Another royal press dispatch from Amenhotpe told that an artificial lake a mile long had been dug for his Queen Teye and completed in fifteen days, which would be a rare engineering feat.

In fact, all of the events that the Pharaoh ordered recorded on scarab newsletters would rate as front page news today, and must have been absorbing to the subjects of the Golden Emperor.

That Amen-hotpe issued these commemorative scarabs has been well known. But heretofore the articles have been generally considered as tokens or ornaments, rather like medals, given to those whom the king delighted to honor and who were aware of his doings.

Says Ambrose Lansing, Egyptologist of the Metropolitan Museum of Art:

"It has been supposed that these scarabs were presented by the king to the courtiers in the palace, and this may be the case, although their weight is rather against their having been worn as ornaments."

But a line of hieroglyphics on the newly acquired scarab suggests to an expert eye the widespread "publication" of the king's great days. The significant line stands by itself, not on the under side of the scarab where the news story is told, but on the top side where the oval object is cut to resemble the beetle. The line names the king as beloved of the god Horus of Buhen.

Mr. Lansing explains that Buhen is an ancient Nubian city in the Sudan, far from Egypt proper. The Metropolitan has reason to believe that the scarab was found in Nubia.

Mr. Lansing concludes: "It is, in fact, most likely that our scarab was sent to this outlying city as a 'newsletter' to tell the priesthood and officials there what was going on in the court at the capital."

Science News Letter, February 8, 1936

ZOOLOGY

Giraffes Not Mute, African Hunter Finds

GIRAFFES are not mute. The annual report of the Kenya (Africa) Game Warden contains the newest challenge of an old belief that giraffes make no sound.

A hunter in the British-held territory of Kenya, who was given permission to thin out a herd of giraffes in a farming district by capturing specimens alive for export to museums, states that a young giraffe, when separated from its mother, bawls and lows pathetically, like a calf taken away from the cow.

Science News Letter, February 8, 1936

INVENTION

Cement-Coated Shingles Safer, More Economical

CEMENT-coated asphalt shingles will soon go on the market. Better fire resistance, less erosion, greater insulation properties and fewer shingles per roof are among the advantages claimed for them.

Conventional asphalt shingles are given an extra coating of special formula hydraulic cement to form the new product. The increased rigidity attained makes it possible to expose a greater area of each shingle; an ordinary asphalt shingle is exposed five inches—the cement-coated ones may be exposed seven inches. The cement coating; it is also claimed, will take a variety of permanent colors not heretofore usable.

Science News Letter, February 8, 1936

ENGINEERING

Second Highest Dam Built in France

FRENCH engineering skill recently completed the second highest dam in the world.

It is the Sautet Dam, at the headwaters of the Rhone River in the French Alps. The structure, a thin wall of concrete 414 feet high, blocks the narrow canyon of the Drac River. (*Engineering News Record*, Nov. 21, 1935.)

Though second to Boulder Dam in height, it is by far the highest in the world to be built upon tricky limestone. As at the Tennessee Valley Authority's Norris Dam in this country, extreme precautions have been taken to fill the caves and hollows through which water might leak around the dam. Hundreds of holes were drilled into the limestone near the structure — their combined depths total 20,000 feet—and 3,000 tons of cement were pumped into them under pressures as great as 500 pounds per square inch.

Engineers were spurred to conquer extreme difficulties in building Sautet Dam because the structure will store water until needed by several power plants downstream. It is also similar to Norris Dam in this respect.

Sautet's power plant is wedged into the bottom of the narrow canyon. Space there is so scarce that the plant's six 13,000 horsepower generating units are controlled by cables from the top of the dam.

Science News Letter, February 8, 1936

DACTYLOGRAPHY

Can Fingerprints be Forged?

Criminals Have Tried to Escape Identification By Changing Ridges—But So Far All Have Failed

By MARJORIE VAN DE WATER

THE DIONNE quintuplets are said to have refused to be fingerprinted.

A police officer, trained to fingerprint reluctant criminals, was helpless in the face of infantile vocal protests and squirmings multiplied by five.

Fingerprints of these unusual little girls are wanted not because a career of crime is feared for them but for the sake of having positive identification of them in case they ever should get mixed up or lost, and also to provide scientific evidence of their resemblances to each other.

Even the quintuplets, born all at one time, do not have two hands among them with fingerprints exactly alike. Each human being who comes into the world brings with him his own distinctive sign of his identity on his hands and this is different from that of any other person who ever lived.

From infancy until the individual grows old and dies, the print will remain unchanged and distinctive.

Criminals have used all their ingenuity in attempts to get around the fingerprint system and avoid its positive identification. So far their efforts have failed.

But two new reports from the medical world have again raised the question, "Can fingerprints be altered or forged by a fugitive from justice?"

Leprosy Altars the Patterns

From Rio de Janeiro comes the report that leprosy alters the designs of the fingerprints.

Individuals attacked with leprosy, whose hands appear to be absolutely normal, may have the design of ridges on the finger tips so completely altered that positive identification would be impossible by this means.

This is the discovery reported by Dr. Leonidio Ribeiro to the Academy of Medicine in Paris. Studying the patients in a hospital for infectious diseases, Dr. Ribeiro told of finding scores of patients with such altered fingers.

But would any criminal be so desperate that he would prefer the living death of leprosy to detection by the law? It would be necessary for him to keep the disease and not get well, for treatment restores the finger ridges to their normal pattern, Dr. Ribeiro says. Study of a soldier's fingerprints taken while he was in the army showed that the alterations lasted for four years and then disappeared almost completely in some of the fingers after eight months of treatment.

Department of Justice officials are of the opinion that, although leprosy may raise a new problem for police officers in countries where that disease is more common, in the United States it will not prove to be very important.

Criminals here have so far never tried to catch skin diseases to alter their fingers. But they have filed their fingers to remove the skin, they have burned them with acids and with fire, and they have cut them and torn the skin away.

John Dillinger, in his desperate flight from the law, burned or corroded every one of his fingers, probably with a powerful acid, in a despairing effort to remove the tell-tale marks from his hands.

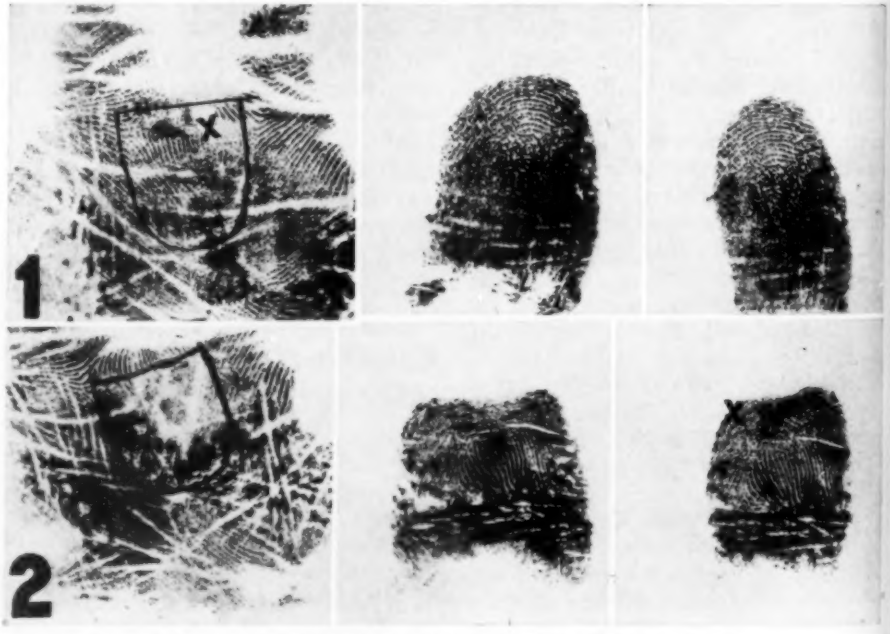
He may have thought that he succeeded. The regular patterns of loops and whorls made by the ridges of skin on his fingertips were broken by large splotches of burned areas where the ridges were literally eaten away. These areas show up as large white spots on the fingerprints taken after he was caught.

But all the pains he took (and pains is a very accurate word for it) were in vain. In the first place, police officers had no need for his fingerprints to identify him. He was only too well known to them without the prints.

But the prints, for all the mutilation, provided positive and conclusive identification.

Authorities agree that twelve points of similarity in any two fingers are sufficient to establish identity. On Dillinger's fingerprints, after all the destruction of ridges, experts found more than 300 such points.

Each one of his ten fingers still bore



FALSIFICATION THROUGH TRANSPLANTATION

False fingerprints can be made by transplanting skin from the palm of the hand, Dr. Howard L. Updegraff, of Hollywood, has demonstrated. Upper row shows the print of palm, a print of the forefinger obtained by rolling, and (at right) a plain impression of the same finger. Lower row shows prints of the same areas after the transplant. The palm area is beginning to show the ridges of the forefinger transplanted upside down, and the finger impressions show the ridges from the palm, also inverted. If you look closely, you can see where the "patch" joins the other skin.

plenty of distinguishing marks to pin his identity on him.

"Gus" Winkler—murderer, racketeer, bank robber—was another fugitive from justice who tried to disguise his identity by altering his fingerprints. He was probably inspired to do so by an accidentally acquired scar on his right forefinger. He slashed or tore the flesh of the fingers on his left hand until parts of the ridges were torn away. One finger he may have deliberately cut in such a way that the ridge pattern known to experts as a whorl then appeared to be a loop. At any rate, whether intentionally or not, the pattern was changed.

But these changes did not make identification impossible or even particularly difficult. It did change the classification of his prints in the police and Department of Justice files.

Single Print File Holds Answer

But the Department of Justice has the answer to this problem. They already had it before this question of multilated prints came up. It lies in what is known as the single print file.

Here are kept the fingerprints of a certain group of particularly notorious and troublesome criminals, filed, not by the classification of all ten prints, but with all the thumbs in one file, index fingers in another, and so on.

When prints are found at the scene of a crime or on a kidnapping ransome note, or in any such incriminating location, it is seldom indeed that the guilty person is accommodating enough to leave all ten finger marks. But often it is possible to decide from its placing on the object with relation to other prints whether a single print is from a thumb, a first finger, or a little finger.

This print can then be taken to the single print file and quickly matched with that of the guilty person if his prints are contained in it.

Scars Are too Conspicuous

This file would also serve in identifying a person with altered fingerprints. In the first place, when such a person is arrested, police can easily see that the prints have been tampered with. The scars are conspicuous; the prints unnatural. Then, too, the police arresting him may have more than a vague suspicion of the identity of the man they have caught.

The next step is to classify the suspect's fingerprints, one by one, and search for them in the single print file, comparing each one with all those falling in that classification. Such a comparison has quickly resulted in positive identification in every case that has come up so far.

KIDNAPPERS BEWARE: HIS FINGERPRINTS ARE ON FILE

This baby has kidnapping insurance in the form of fingerprints on file in the non-criminal file of the U. S. Department of Justice.

So far there have been very few cases of fingerprint mutilation. Officials of the Department of Justice estimate that probably not more than a dozen instances have ever been known in the United States.

Desperate Devices in Vain

"Jack" Klutas, or "Handsome Jack," was another well known criminal who was willing to sacrifice the appearance of his fingers by savagely slashing them in order to remove the ridges. This attempt, too, was unsuccessful in preventing identification.

Few criminals have resorted to such efforts for eliminating fingerprints, because even if they should succeed, it would only be for a time. Most of these scars and alterations last only for a time. As the fingers heal, the ridges recover and the patterns are restored just as they were originally.

But even if the scars should be permanent, the criminal still could not evade detection unless he should also give up his career of crime. As soon as the new set of prints is put on file, then it would become necessary for him to go through the procedure of changing them all over again.

Could a desperate criminal in danger of his life forge his fingerprints? Could he have an expert surgeon transplant living skin from some other part of the body to the fingers so that perfect but false fingerprints would result?

Actually, this surgical feat has been accomplished—not to aid a criminal but as a mercy to a man whose hands had been badly burned. It is reported by Dr. Howard L. Updegraff, of Hollywood, California, who described the operation in the *American Journal of Surgery*.

It was necessary to provide the man with a new touch pad for the end of his right forefinger. Dr. Updegraff selected an area on the man's palms having ridges similar to those which appear on the fingertips. A patch of this skin was transplanted to the injured finger.

The result, after healing, was a completely altered fingerprint. Where there had been ridges interrupted by scar tissue, now there was a clear pattern, but this pattern was that of the palm, not that which had originally been on the finger.

Transplanting of ridged skin—the forging of fingerprints—is apparently a possibility.

Line Shows Transplanted "Patch"

But the Department of Justice is not greatly worried about it. In the first place, although a plain impression, taken by simply pressing the finger on paper, shows nothing to indicate tampering with the finger; a rolled impression such as used by the police and justice officials in fingerprint records shows plainly the seam where the transplanted skin joins the other.

In case police suspect, from examination of the prints or fingers of the prisoner, that a transplant has been made, search of the rest of his body

would reveal the place from which the transplant was taken.

The fantastic tales being told of the wonders of surgery in transplanting skin are not all true. A criminal could not take the fingertips of another person. He could not use an ape for this purpose.

Successful grafting of skin is a most difficult operation. Most of what has been learned of the art of plastic surgery was learned under the pressure of necessity after the Great War, when men learned to restore the faces of those bearing ghastly scars resulting from their wounds.

Surgeons Not Available

The operation must be performed by a very skillful surgeon, and such men command high fees and the greatest respect in the legitimate pursuit of their profession. What inducement would there be for such a man to serve the needs of an outlawed criminal seeking to escape from justice?

The skin must usually be transplanted from the patient's own body, for the skin has a natural tendency to reject any foreign matter, even foreign skin. Nearly everyone is familiar these days with the way the skin acts when vaccine is injected. The skin gets sore and red, and the result is a scar.

Much the same thing might happen if someone else's skin were transplanted to make a patch on yours. When it is necessary to use skin from another person, the surgeon selects someone closely related to the individual and someone with the same blood grouping, just as they do for a blood transfusion.

Even with the best of care, the operation often fails. So far as is known, no criminal has ever tried it.

Those who believe that future developments of medical science might enable criminals to resort to such fingerprint forgeries have suggested other means of positive identification to supplement the fingerprint system.

Even Identical Twins Differ

Although 2,000,000,000 persons live now on the earth and countless billions have preceded them, no two of them are exactly alike—not even identical twins. A careful look, especially with the help of X-ray or microscope, will reveal thousands of differences.

For this reason, X-ray pictures of teeth, the bone formation of the sinuses, or other parts of the body have been used for identification. Even the dentist's record of tooth fillings and artificial teeth is valuable in making identification. Such methods are particularly valuable in identifying persons who have met death by drowning when the body may not be recovered in time to make ordinary methods of recognition easy. Fingerprints have seldom been useful in such cases in the past because law-abiding citizens have not had their prints on record anywhere.

Now, however, the Department of Justice maintains a file of fingerprints of citizens in good standing. Wealthy babies in danger of kidnapping have records there to hinder the kidnapper. Careful men of affairs file their prints as a matter of prudence—to avoid any possibility of becoming ill or dying unknown in a strange place, and to settle the authenticity of wills and other important documents beyond question.

Blood Vessel Pattern in Eye

Another scheme for identification was recently proposed by Drs. Carleton Simon and Isidore Goldstein, of New York City. A certain type of camera that has been in use by physicians for detecting eye diseases makes a photograph of the optic nerve and the network of blood vessels in the eye. Such a picture is quickly and easily taken right through the pupil of the eye.

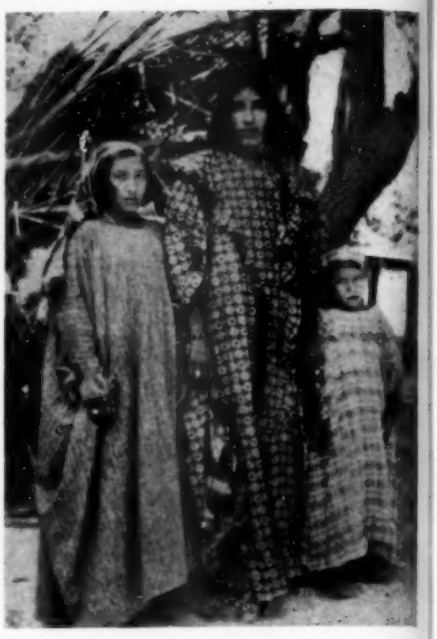
Drs. Simon and Goldstein have worked out a system for classifying the resulting patterns, so that now they might be used as an identification in much the same manner as fingerprints are used. As with fingerprints, the pattern is different for each individual, and will not change unless the eye is destroyed.

Difficulties in Technique

The difficulty in the way of practical use of this system is the expense of having such a camera in every police station where prisoners must be identified, and the difficulty of training police officers in the technique of taking the pictures. Fingerprints can be taken by anyone who has a pad of ink and a piece of paper, if he has once seen it done correctly.

X-ray pictures, and probably these eye photographs, must always be taken with the camera at exactly the same angle if identical results are to be obtained. It is doubtful whether the county sheriff in Nebraska, the police chief in Honolulu, or the Federal agent in Washington could all take pictures of the same man that would match up exactly and afford positive identification.

With fingerprints, such long distance comparison is a matter of daily routine. When and if this easy system is ever defeated by criminals, then these other systems of identification remain to be developed.



NOT LOCKED UP

Guajiro Indian princess, who has been married and is therefore allowed at large, with two little sisters who are not yet old enough to be locked up.

FISHERIES

Fish Used For Live Bait Threaten to Spoil Fishing

FISHERMEN in Utah's trout streams are threatened with serious damage to their sport because other fishermen make use of live bait.

This ironic situation has received the attention of W. F. Carbine, of the University of Utah. Small fish used as live bait sometimes slip off the hook, and live to grow up and reproduce. Prominent among fish thus introduced into Great Basin waters is the chub, a species not particularly esteemed for either sport or food.

This fish makes life harder for trout in two ways. It produces many more eggs, in the same spawning grounds that the trout frequent. The more numerous and hardy young chub gobble up a great deal of the food that the troutlings would normally have for themselves.

Young trout that survive this period of over-competition for nourishment find that their troubles are not over by any means. As they swim down the streams, the adult chub, which are big fish measuring up to sixteen inches in length, pounce on them and gobble them up in numbers. Young chub, on the other hand, are not taken for food to any extent by the adult trout.

ETHNOLOGY

Tribe Has Strange Ways With Brides and Killers

Bridegroom Does Not See Bride Until They Have Been Nine Days Married; Young Girls Kept Locked Up

NEWS of a tribe that has strange ways with murderers, and stranger ways with brides, is brought by Dr. Vincenzo Petrullo, anthropologist explorer of the University Museum, recently returned from leading an expedition into Venezuela.

Protection of a powerful chieftain made it possible for the expedition to spend three months in actual contact with this little-known people, the Guajiro Indians, Dr. Petrullo declared in an exclusive interview. The expedition was conducted jointly by the University Museum of the University of Pennsylvania, Columbia University and the Latin American Institute.

A Guajiro Indian of high degree pays a great deal for his wife—whom he has never laid eyes on, Dr. Petrullo learned. Marriageable girls are kept locked up, seen only by their families. At the marriage ceremony, the bridegroom still does not behold his bride. Nine days later, he sees her for the first time by daylight, although he has spent the nine nights after the ceremony with his wife, entering and leaving the room in darkness.

Guajiro Women "Go Modern"

But even Guajiro women are going modern, for Dr. Petrullo was told that this marriage custom is slowly being broken down by the women themselves.

Guajiro methods of handling crime were also found unusual. If a member of a Guajiro clan slays a member of another and friendly clan, it is the duty of the murderer's own clan to execute him. No disgrace is attached to such an execution, and the clans remain friendly. Failure to deal out justice in this way, however, is a signal for sharp reprisal. The group victimized by the murder sets out to kill the murderer's entire family, except the children, whom they take as slaves.

Originally, Guajiros lived by gathering wild plants, hunting, and perhaps some farming, Dr. Petrullo reports. But after Europeans brought horses, cattle, donkeys, sheep, and goats into South America, the culture of these Indians changed. They are now pastoral, farming a little when there are rains in their sandy, semi-desert country.

A Guajiro measures wealth by the size of a man's herd and flocks, said the anthropologist, and these are acquired chiefly for social display at funeral feasts. Thousands of animals may be killed to feed the multitude of guests at one of these occasions.

Guajiros rival Arabs in horsemanship. In fact, Dr. Petrullo ranks Guajiro riders among the greatest horsemen of the world. Racing is their great sport, and they breed horses especially for that purpose.

Guajiro Indians never travel alone. A chieftain goes about with half a dozen well armed retainers, and if the trip is a long one and the chief very important, this body-guard may be increased. Important women likewise travel accompanied by large retinues of servants and slaves.

The University Museum expedition found, along the sea coast, numerous cemeteries of a race that inhabited the peninsula before the coming of the Guajiros. Digging into some of the graves revealed skeletons painted red.

This, Dr. Petrullo explains, means that these ancient people practised secondary burial. That is, they buried their dead twice, digging up a body after it had been reduced to a skeleton and painting and reburying the bones.

Pottery that these earlier inhabitants made was found with the burials. The earlier people lived largely on mussels from the sea, Dr. Petrullo infers from finding great heaps of shells and from their nearness to the shore.

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ARCHAEOLOGY

Old Stone Age Men Were Farmers, Says Archaeologist

EUROPEANS were farmers back in the Old Stone Age, is the claim of an Austrian archaeologist, Col F. Muhlhofer. He explored an Austrian cave inhabited in that chilly time, and found charred wheat grains in quantity. The wheat is botanically identified as a dwarf wheat particularly suited to rough climates such as the advance of glaciers from the North in those days imposed.

If men planted this wheat, then farming goes back thousands of years earlier than supposed. Heretofore, man has been credited with "discovering" agriculture no earlier than about 10,000 B.C.

Grain found in such early households would ordinarily be taken for wild grain, gathered and stored as food. But the Austrian archaeologist declares that paintings in the cave support his theory that the grain was planted.

Like many cave men of Europe, inhabitants of this cave painted and etched pictures on the walls showing bison, horses, and other figures. These are usually interpreted as hunting scenes.

But Col. Muhlhofer thinks in this case the cave art is a variation of the modern scarecrow that frightens birds and beasts away from the farmer's corn.

The pictures are like this—judge for yourself: An array of points represents the planted field, by the archaeologist's interpretation. Numerous red hands and arrows are meant to prevent animals from entering man's fields. A horse coming too near the points is shown shot by an arrow. A bison approaches the field without regarding the red hand. In the next picture the bison turns and runs with an arrow in its body.

Such pictures, according to the theory, are not unlike modern safety-first posters. They seem to be a course in visual education for the animals: stay away from our fields, or else—!

As they are inside the cave, they could not be ordinary scarecrows for the animals to see, literally. Col. Muhlhofer thinks that the idea was similar to the cave man's sympathetic magic tricks for good hunting. That is, he would reproduce with art in his cave the event he wished to duplicate in real life with the animals, and then by religious or magic rites, the art scenes were expected to get results.

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BOTANY

NATURE RAMBLINGS

by Frank Thone

Flowers of Trees

See Front Cover

FLOWERS, to most of us, practically always mean the flowers of non-woody plants. We are perennial children, always gathering handfuls of daisies and buttercups, violets and spring-beauties. To be sure, there are such things as lilacs and snowballs and roses, that grow on shrubs; but they are harder to break off, and often have the added disadvantage of thorns. So we let flowers with wooden stems into the picture with a certain unconscious unwillingness.

And the flowers of trees fare even iller than do those of bushes. Some, to be sure, we admit as of surpassing beauty—the Japanese cherries around the Tidal Basin in Washington, D. C., an apricot orchard on a California hillside, a big round apple tree anywhere. But even for these we reserve a feeling that after all they are destined to produce fruits: their real significance is to come later. Other beautiful tree flowers, like magnolia and catalpa, are mostly clean out of reach in the first place, and too big to be vased successfully if we should go to the trouble of bringing a step-ladder and capturing some of them.

As for the great majority of tree flowers, we simply pass them by as "small, green, insignificant" or otherwise not worthy of notice. Many of us, indeed, pass through life in indifferent ignorance of the fact that trees like pines and oaks and beeches have any real flowers at all.

One of the difficulties is that we have eyes that see not, unless the thing looked at is really pretty big. The beauty of the complex little structures within the catkin of an oak or alder or hazel-bush is lost on us. To most of us, they are just messy things that shed pollen, or receive it from the wind and eventually make a seed or nut. If we could only take a gnome's-eye view of the matter, these ignored flowers would spring up in beauty and wonder of their own.

This service has been performed for us by Prof. Walter E. Rogers of Lawrence College. In a big new picture-book which he has just published, he presents magnified photographs of a great variety of tree and shrub flowers, most of which are passed up without second glance by the great majority of people—even by the great majority of hikers in the spring woods. The female flower of a walnut becomes a rough-coated vase with a pair of plumes thrust into it; the flower of a chestnut shines forth as a fairy hand with many waxen little fingers. We not only find a new gate into botany, but artists and designers are given hints that may be profitable.

The cover design on this issue of the SCIENCE NEWS LETTER is from a photograph of a *Kalmia* flower, in Prof. Rogers' book.

Science News Letter, February 8, 1936

PHYSICS

Danish Foundation Makes Grant for New Laboratory

DENMARK'S most famous physicist, Prof. Niels Bohr, who won the Nobel Prize in 1922, has received a grant of 150,000 kroner (approximately $34,000) to be used in founding a high current generating laboratory in the Institute of Theoretical Physics at the University of Copenhagen.

The Carlsberg Foundation of Copenhagen is the donor. The Foundation promotes scientific research and publication and finances the activities of the Danish National Academy of Science. It was started in 1876 by Capt. J. C. Jacobsen, noted founder of the Carlsberg brewing company.

The Thirge Company of Odense is giving a 56-ton electromagnet for the new laboratory, which may mean that a giant magnetic accelerator of the cyclotron type as used by Prof. E. O. Lawrence at the University of California is about to be built.

The electromagnet is the most costly part of all cyclotron equipment, especially in the larger sizes. Prof. Lawrence's apparatus weighs 85 tons, and at Columbia University in New York City a discarded Navy magnet weighing 65 tons is being set up for use as a cyclotron particle generator.

The cyclotron apparatus speeds up charged atomic particles to energies of millions of volts and is a convenient means of creating neutrons. Neutrons are the non-electrical particles of atoms which can easily pierce the inner nuclear walls of atoms and by their impact disclose hidden atomic secrets.

Science News Letter, February 8, 1936

RADIO

February 11, 4:30 p. m., E.S.T.

THE CRIMINAL MIND—Dr. John E. Lind, St. Elizabeth's Hospital, Washington, D. C.

February 18, 4:30 p. m., E.S.T.

THE GEOGRAPHY OF DISEASE—Dr. Earl B. McKinley, Dean of the Medical School, George Washington University, Washington, D. C.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

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•First Glances at New Books

Medicine

VITAMINS IN THEORY AND PRACTICE—Leslie J. Harris—*Cambridge* (*Macmillan*), 240 p., $3. Here is the story of the vitamins, not only from A to E but from the first two-century-old discovery of the relation of scurvy to orange juice to the 1933 triumph of the artificial manufacture of vitamin C in the chemical laboratory. From a wide knowledge of the field, the author gives not only all the essential facts about the vitamins but many interesting sidelights on the studies leading to their discovery and use in nutrition. He summarizes the whole subject with a chapter which answers just the questions every reader wants to know: Is instinct or appetite a safe guide in food selection? What should one eat? Can the average person afford the ideal diet? What will he have to show for it if he does follow it? The book is fairly simple but not elementary in style. However, the story progresses step by step with frequent reviews of the facts and with many helpful charts and diagrams, so that careful reading will give real knowledge rather than a confused smattering of information. There are numerous striking and unusual illustrations.

Science News Letter, February 8, 1936

Geology

THE HISTORY OF THE UPPER MISSISSIPPI RIVER IN LATE WISCONSIN AND POSTGLACIAL TIME—William S. Cooper—*Univ. of Minnesota Press,* 116 p., 46 figures, 4 plates, $4. A detailed story, well illustrated, of one of the most important and at the same time most difficult of American geologic ages. Of special use to workers in special fields of geology, ecology and geography.

Science News Letter, February 8, 1936

Endocrinology

A. B. C. OF THE ENDOCRINES—Jennie Gregory—*Williams & Wilkins,* 126 p., $3. This book is entirely made up of diagrams, schematic drawings, and the like, with explanatory labels and, occasionally, brief text. It might be called the picture book of the glands. The author has undoubtedly taken extreme pains to make the subject clear by this pictorial method, and the scientific facts have been carefully checked. Nevertheless, it is doubtful whether the lay reader can make much of the book without considerable study, nor would this volume seem particularly useful as a handy reference for medical student or practitioner. The interrelations of the endocrine glands and their many effects on different body functions are probably too complex to be reduced to easily understood diagrams. In this volume confusion seems to be increased by the use of numerous unfamiliar symbols.

Science News Letter, February 8, 1936

Psychic Research

GHOSTS I HAVE TALKED WITH—Henry C. McComas—*Williams & Wilkins,* 192 p., $2. The author, a psychologist, relates his experiences in investigating spiritualistic mediums and their methods. In the final chapter, on superstitions, he explains simply and clearly why a great number of people are easily convinced of the claims of spiritualism. The book is entertaining in itself, and should clear up the whole subject for the careful reader.

Science News Letter, February 8, 1936

Botany

TREE FLOWERS OF FOREST, PARK, AND STREET—Walter E. Rogers, Drawings by Olga A. Smith—*Pub. by the author, Appleton, Wisconsin,* xiv, 500 p., $7.50. See page 94.

Science News Letter, February 8, 1936

Science

REPORT ON THE PROGRESS AND CONDITION OF THE UNITED STATES NATIONAL MUSEUM FOR THE YEAR ENDED JUNE 30, 1935—Smithsonian Institution—*Govt. Print. Off.,* 121 p., 20c.

Science News Letter, February 8, 1936

Science

SCIENCE GUIDE FOR ELEMENTARY SCHOOLS; Vol. 1, No. 8, March, 1935—*Calif. State Dept. of Education,* Monthly, $1.25 per year. This new periodical should be warmly welcomed by teachers who want authoritative information briefly and simply presented. The number reviewed is devoted to Trees.

Science News Letter, February 8, 1936

Economics

EASTERN INDUSTRIALIZATION AND ITS EFFECT ON THE WEST—G. E. Hubbard, assisted by Denzil Baring—*Oxford,* 395 p., $7. The fact that Japan has adopted the industrial revolutions of the western world for her own and taken jobs away from the cotton mills, blast furnaces and other industries of England and America, particularly, is cause for concern. Now India and China are growing up industrially. This study under the auspices of the Royal Institute of International Affairs in London is written with special reference to Great Britain and Japan. The conclusion written by Prof. T. E. Gregory will be read with profit and also perhaps with dismay by business men interested in Far Eastern trade.

Science News Letter, February 8, 1936

Science News Letter will secure for its subscribers any book or magazine in print which was published in the United States. Send check or money order to cover regular retail price ($5 if price is unknown, change to be remitted) and we will pay postage in the U. S. When publications are free, send 10c. for handling. Address Book Dept., Science News Letter, 2101 Constitution Avenue, Washington, D. C.

SEX PRACTICE IN MARRIAGE

By C. B. S. Evans, M.D.

THIS little book—which can be read in half an hour—contains concentrated practical advice which would have saved many a marriage from going on the rocks, had husbands known its contents earlier. Its author is a member of the Faculty of Obstetrics and Gynecology at the Northwestern University Medical School, was a member of the White House Conference Committee on Maternal Care, and is in actual practice of medicine. Plenty of men think they "know it all," and blunder into the divorce court because they blundered clumsily in marriage and then accused someone else of frigidity. To use knowledge, you must first possess it. If something is wrong, maybe it is yourself, after all. If not, probably this isn't your book.—*Scientific American.*

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BIOLOGY: How does it Educate?

GENERAL biology offers the pupil a dramatic experience in a new realm of interest, with new tools and a new point of view.

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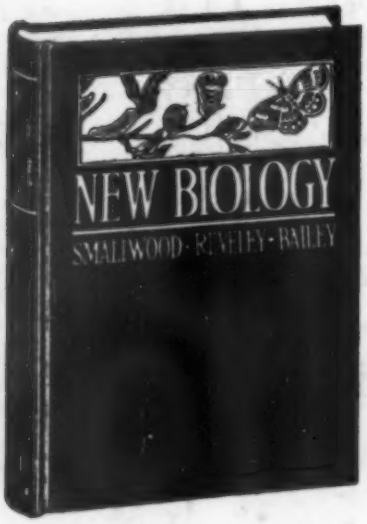
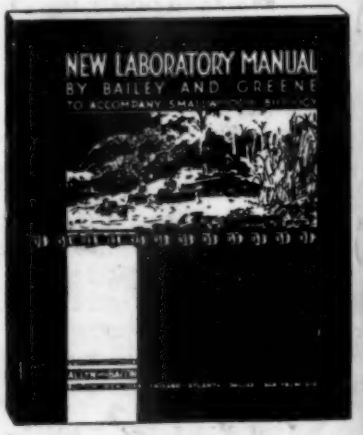


In general, biology is the study of the fundamental functions of living things, thus enriching the student's own life; in particular, it is the creating of scientific attitudes toward ourselves and our living environment. It parallels in its objectives the cardinal aims of education.

The biological unit is the *living* individual. It is through the study of the life processes common to all living things that the fundamental facts of human living are learned. Out of this mass of old and new facts comes the knowledge of the interrelationship of man to the plant and animal world. The need for conservation of plant and animal life and the need of development and improvement of all living organisms result as a natural corollary.



The textbook is the medium for transmitting facts. It should not only teem with facts, but it must provide a program of pupil activities. It must furnish plenty of indoor laboratory work for the discovering of facts and proof, and field work for stimulating interest in life processes. It must emphasize Health by establishing habits of physical and mental well-being; Vocation by discovering interests and aptitudes as a help in vocational guidance; Leisure by developing leisure-time activities; Citizenship by presenting situations which have direct bearing on home life, group conduct, and human service.

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